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Teacher-child interactions.

Relations with children's self-concept in second grade

Keywords: teacher-child interactions, self-concept, childhood

Abstract

This study examined whether teacher-child interactions characterized by teacher involvement, structure, and autonomy support at the beginning of second grade predicted children's global, academic, social, and behavioral self-concept at the end of second grade. The study was conducted in 30 second grade classrooms with 570 children and their teachers. Data included teacher reports of teacher-child interactions and child reports of self-concept. Results showed that, when controlling for the initial level of self-concept, children's social self-concept was predicted by teacher involvement, structure, and autonomy support. In addition, teacher autonomy support predicted high academic self-concept. Finally, these teacher-child interaction characteristics did not contribute to the behavioral and global self-concept. The results were similar for boys and girls.

Teacher-child interactions. Relations with children's self-concept in second grade

It is now well established that children, even at very young ages have a sense of self (Harter, 1998; 2006; Marsh, Craven, & Debus, 1991). A positive self-concept is a desirable outcome (Marsh et al., 1991) and individual differences in children's self-concept have been shown to be linked to concurrent and later adjustment variables such as life satisfaction (Huebner, 1991), status in the peer group (e.g., Rudolph, Hammen, & Burge, 1995), school adaptation (e.g., Verschueren, Buyck, & Marcoen, 2001), academic achievement (e.g., Guay, Marsh, & Boivin, 2003; Marsh, Byrne, & Yeung, 1999), and symptoms of depression and anxiety (see Dubois & Tevendale, 1999 for an overview). It has been hypothesized that a major source of these individual differences in children's self-concept derives from the interactions with significant others (e.g., Bowlby, 1969; Bretherton, 1993; Cassidy, 1990; Cooley, 1902; Mead, 1934; see also Harter, 1999; 2006). According to symbolic interactionists (e.g., Cooley, 1902; Mead, 1934) interactions with significant others shape the sense of self by providing the child with information about how significant others view himself/herself, which is then incorporated into their self-concept. Similarly, in attachment theory (e.g., Bowlby, 1969; Bretherton, 1993; Cassidy, 1990) it is argued that a working model of self emerges from a representation of the attachment relationship between caregiver and child. Both theories hypothesize that supportive interactions with significant others will result in positive feelings toward the self; whereas interactions characterized by disapproval will make the child devalue the self, leading to low self-esteem (see Harter, 1999). This internalization process of others' standards and opinions about the self is thought to start from middle childhood on (from 7 to 8 years old), whereas at younger ages the child merely identifies the standards and opinions of others whom he/she wants to please, and attempts to regulate his/her behavior accordingly (Connell & Wellborn, 1991; Higgins, 1991). Moreover,

from middle childhood on, children's self-evaluations become more realistic (Bouffard, Markovits, Vezeau, Boisvert, & Dumas, 1998; Harter, 1996; 2006; Marsh et al., 1998; Marsh, Ellis, & Craven, 2002). This makes 7- to 8-year-olds an interesting age group when studying self-concept.

However, studies on the link between interactions with significant others and self-concept have especially focused on young children. (e.g., Coopersmith, 1967; Doyle & Markiewicz, 2005; Maccoby and Martin, 1983; Peterson, Southworth, & Peters, 1983; Shek, 2007; Verschueren & Marcoen, 1999; Verschueren, Marcoen, & Schoefs, 1996). Moreover, in the studies mentioned, self-concept has been mainly linked to parent-child interactions. In middle childhood, however, the child starts formal schooling in elementary school, expanding the social domain in which he/she functions, now also including interactions with another important caregiver: the teacher (see Bronfenbrenner & Morris, 1998; Ladd, 1990; Patterson, Reid, & Dishion, 1992; Reid & Eddy, 1997). The purpose of the present study is to investigate the relations between the interactions with the classroom teacher and children's self-concept in 570 7- to 8-year-old children in second grade.

Within elementary school, interactions with teachers play an important role in children's development and adjustment to the school context (e.g., Davis, 2003; Juvonen & Wentzel, 1996; Ladd, 1990; Mantzicopoulos, 2005, Pianta, Hamre, & Stuhlman, 2003). It has been hypothesized that teacher-child interactions can also influence children's self-concept (see Harter, 1999). In accordance with parent-child interactions, teachers who are affectionate, emotionally available and involved with the child and support their mastery attempts are expected to produce children who mirror and eventually internalize this support in the form of positive self-evaluations, whereas teachers lacking responsiveness, nurturance, encouragement, and approval, as well as teachers who are rejecting, punitive, or neglectful will cause children to develop negative self images and feelings of being unlovable,

incompetent, and generally unworthy (Harter, 2006). Cross-sectional studies (e.g., Colwell & Lindsey, 2003; Demaray, Malecki, Rueger, Brown, & Summers, 2009; Hardre & Reeve, 2003; Muijs, 1997; Parsons, Kaczala, & Meece, 1982; Patrick, Mantzicopoulos, Samarapungavan, 2008, Pekrun, 1990; Valeski & Stipek, 2001) have provided evidence for the link between supportive teacher-child interactions and children's self-concept, especially in the academic and global domain. For example, the academic competence of kindergartners (Patrick et al., 2008) and adolescents (Parsons et al., 1982) was linked to teacher praise. Approving and supporting teacher-child interactions have also been linked to kindergartners (Colwell & Lindsey, 2003), children's and adolescents' global self-concept (Demaray et al., 2009; Harter, 1996). Moreover, in a recent study, longitudinal relations have been found between negative teacher-child interactions and children's self-concept. More specifically, teacher-child conflict in fall of first grade negatively predicted children's global self-concept three months later (Doumen, Verschueren, Colpin, & Buyse, under review).

The present study

Despite these findings many aspects remain unclear. In the present study some of these aspects will be addressed. First, most studies on the relationship between supportive teacher-child interactions and children's self-concept are cross-sectional. Although researchers usually suppose that the direction of effect is from supportive teacher-child interactions to children's self-concept, it is equally possible that individual differences in children's self-concept determine the support of the interactions with the classroom teacher (e.g., Colwell & Lindsey, 2003). The present study will examine the relationship between supportive teacher-child interactions and children's self-concept longitudinally, allowing for the examination of the hypothesized direction of effects. More precisely, the effect of supportive teacher-child interactions at the beginning of the school year on children's self-concept at the end of the school year will be investigated.

Second, there is a general consensus that the self-concept of children is multidimensional (e.g., Eccles, Wigfield, Harold, & Blumenfeld, 1993; French & Mantzicopoulos, 2007; Marsh et al., 1991; Van Den Bergh & De Rycke, 2002). Harter (2006) distinguishes global and domain-specific evaluations about the self. Global self-evaluations, typically referred to as self-esteem, self-worth, or global self-concept (see Harter, 2006 for an overview) focus on the overall evaluations of one's worth or value as a person, and is assessed by a separate set of items that explicitly tap one's perceived worth as a person (e.g., "I feel that I am a worthwhile person"). Domain-specific self-evaluations or self-concept refer to evaluative judgments of attributes in discrete domains, such as cognitive competence and social acceptance (Harter, 2006). This differentiation seems important as different aspects of children's self-concept have been linked to different features of social relations in studies with parents and peers (e.g., Hughes, Dyer, Lou, & Kwok, 2009; Verschueren & Marcoen, 1999; Verschueren et al., 1996). Previous studies on the link between teacher-child interactions and children's self-concept have especially focused on one aspect of children's self-concept (frequently global or academic self-concept). The present study will not only include global self-concept, but also three domain specific self-evaluations which have shown to be important for children in middle childhood (Harter, 1985; 1990), namely academic, social, and behavioral self-concept. We will investigate whether teacher-child interactions will affect these four aspects of children's self-concept in the same way.

Next to different aspects of self-concept, researchers have identified many characteristics of teacher-child interactions (see Davis, 2003; Mantzicopoulos, 2005 for a review). One approach postulates that supportive teacher-child interactions are characterized by high levels of teacher provided involvement, structure, and autonomy support towards the child (Connell & Wellborn, 1991; Skinner & Belmont, 1993). Involvement, also referred to as acceptance or responsiveness, concerns the emotional support of the adult for the child (Gray

& Steinberg, 1999). Involved teachers express enjoyment in the interaction with a student, and show interest in and concern for him/her (Tucker et al., 2002; Wellborn, Connell, Skinner, & Pierson, 1992). Its opposite is rejection or neglect (Skinner & Belmont, 1993). Structure refers to the teacher's support concerning information about how to effectively achieve desired outcomes. Teachers who structure the classroom environment, provide clear and consistent guidelines and expectations, and set rules and contingencies for behavior (Skinner & Belmont, 1993; Tucker et al., 2002; Valeski & Stipek, 2001). Chaos is its opposite (Skinner & Belmont, 1993). Autonomy support concerns the level of self-regulation a child is given, while the opposite is coercing the child. Teachers can support a child's autonomy by respecting his\her opinions and ideas, offering choices, stimulating him\her to explore his\her interests, and explaining the relevance of learning activities (Skinner & Belmont, 1993; Tucker et al., 2002; Wellborn et al., 1992). These characteristics of teacher-child interactions are seen as three conceptually independent dimensions, and it is possible that teachers are high or low on any combination of dimensions (Skinner & Belmont, 1993). Studies have shown involvement, structure, and autonomy support respectively to be associated to several child outcomes (e.g., Connell & Wellborn, 1991; Furrer & Skinner, 2003; Skinner, Wellborn, & Connell, 1990; Tucker et al., 2002; Wentzel, 1998, 2002), and self-concept in particular (e.g., Hardre & Reeve, 2003; Valeski & Stipek, 2001). For instance, research with adolescents showed that their perceived academic competence was more positive when they perceived their teacher as autonomy supportive (Hardre & Reeve, 2003). First graders' perception of their academic competence was more negative when their teacher's directions were vague and classroom rules were ineffectively or inconsistently applied (Valeski & Stipek, 2001). However, most studies do not investigate all three dimensions, making it impossible to assess their unique contribution. The present study will focus on these three characteristics of the

teacher-child interactions, and examine their unique contribution to the different aspects of self-concept.

Finally, it is uncertain whether the effect of teacher-child interactions on children's self-concept is similar for boys and girls. A meta-analysis on sex differences in global self-concept of elementary school children and adolescents showed small differences favoring boys (Kling, Hyde, Showers, & Buswell, 1999). These differences became larger with age. For domain-specific self-concept, sex differences were presented at the beginning of elementary school along domains that reflect gender-role stereotypes (see French & Mantzicopoulos, 2007). Generally, girls had more positive perceptions of their behavioral conduct and literacy abilities, whereas boys rated themselves higher on physical ability and math skills (e.g., Eccles et al., 1993; Jacobs, Lanza, Osgood, Eccles, & Wigfield, 2002; Pallas, Entwisle, Alexander, & Weinstein, 1990). Furthermore, teachers frequently reported having more positive interactions with girls than with boys (e.g., Baker, 2006; Birch & Ladd, 1997; Ladd, Birch, & Buhs, 1999). In addition to these level differences, sex has been shown to moderate the link between teacher-child interactions and children's self-concept. For example concurrent positive links between positive teacher feedback and self-concept was only found for boys (Parsons et al., 1982), and while positive interactions between the teacher and the child were linked to a low self-concept for girls, they were associated to high self-concept for boys (Colwell & Lindsey, 2003). Therefore, an additional research aim of this study is to investigate sex differences in the link between teacher-child interactions and children's self-concept.

In sum, with this study we aim to contribute to the growing body of literature on children's self-concept and teacher-child interactions. The longitudinal relationship between three characteristics of teacher-child interactions (i.e., involvement, structure, and autonomy support) at the beginning of second grade and four aspects of children's self-concepts (global,

academic, social, and behavioral self-concept) at end of second grade (after controlling for their initial levels at the beginning of second grade) will be investigated. We hypothesize that supportive teacher-child interactions, characterized by high involvement, structure, and autonomy support at the beginning of the school year, will positively predict domain-specific and global self-evaluations of children at the end of the school year. We will investigate the unique contribution of involvement, structure, and autonomy support to the different aspects of children's self-concept. In addition, we will test for sex differences in the associations between the teacher-child interaction dimensions and the different aspect of self-concept.

Method

Participants

The children in our study were participants of a randomized controlled trial evaluating the effect of the Good Behavior Game (GBG; Barrish, Saunders, & Wolf, 1969; Dolan, Turkkan, Werthamer-Larsson, & Kellam, 1989; Dutch translation, see van Lier, Muthén, van der Sar, & Crijnen, 2004). Fifteen schools were recruited for this study. Each school had two second grade classes, making a total of 30 classes, with half of the classes in our study (1 per school) being randomly assigned to the intervention condition. Studying intervention effects was however not an objective of this study. Therefore, we will examine whether the intervention status affected the associations studied (see further for more information).

All schools were located in rural to moderately urban communities (populations ranged from about 9 000 to 90 000) in the Flemish speaking part of Belgium (Algemene Directie Statistiek en Economische Informatie, 2004). Students were followed from the beginning of the second grade (fall 2006) to the end of the second grade (spring 2007). All children in these classrooms were eligible for inclusion. Written parental permission was obtained for 570 children (97%). Nearly half of the children (49.5 %) were boys. The majority of the children and their parents had the Belgian nationality (>95%). Most parents completed

higher education (63% of mothers, 57% of fathers). The remaining parents finished high school (28% of mothers, 30% of fathers), or completed primary school (9% of the mothers and 13% of the fathers). Two mothers and one father had received no education.

At the beginning of the second grade (wave 1), the children's mean age was 7 years and 5 months ($SD = 4.6$ months). At the end of second grade (wave 2) 6 children were lost due to grade retention or moving away from school. These children did not differ from the other children in initial levels of self-reported academic self-concept ($t(562) = .43, p = .67$), social self-concept ($t(562) = -.38, p = .70$), behavioral self-concept ($t(562) = .80, p = .42$), and global self-concept ($t(562) = .93, p = .35$). Nor did these children differ from the children still participating in spring in teacher reported involvement ($t(563) = .75, p = .45$), structure ($t(563) = -.12, p = .90$), and autonomy support ($t(563) = -.53, p = .60$) in fall. Finally, for 9 children we only had data of the fall or spring of second grade. These children were ill during the data collection.

Procedure and Measures

Data included in the present study came from two different sources: (1) teacher questionnaires assessing the characteristics of their interactions with each child in the classroom, and (2) child questionnaires assessing domain-specific and global self-concept. At the beginning of second grade (fall) information on teacher-child interactions and children's self-evaluations was collected. At the end of the school year (spring) children's self-evaluations were assessed again.

Children's self-concept was assessed using an adaptation of the Dutch version of the Self-Perception Profile for Children (SPPC; Harter, 1985; Dutch translation by Veerman, Straathof, Treffers, Van den Bergh, & ten Brink, 1997) to make it suitable for children of age 7. In the adapted version the structured alternative response format was changed, replacing the double statements by a single statement, that had to be rated on a 3-point Likert-scale. The

answers were accompanied by squares of different size supporting their content. Following a pilot test, the instrument was further adjusted. This resulted in an instrument comprising of 24 items (with 6 items per scale), tapping Global self-concept (6 items, e.g., "I would like to be different" reversed coded item) and three domain-specific self-concepts, Social (6 items, e.g., "I have a lot of friends"), Academic (6 items, e.g., "I am good at school tasks"), and Behavioral (6 items, e.g., "I do things that are not allowed" reversed coded item) self-concept (the original subscales Physical Appearance and Athletic Competence were not included in our adapted version). In our study the instrument was administered to the group of children in the classroom. At the beginning of the school year Cronbach's alphas were .61, .62, .60, and .65 for academic, social, behavioral, and global self-concept, respectively. At the end of second grade the Cronbach's alphas were .74, .71, .71, and .79 for academic, social, behavioral, and global self-concept, respectively. We conducted confirmatory factor analysis to test the hypothesized underlying factor structure (at the beginning of second grade). Model fit was examined using Satorra-Bentler scaled χ^2 , Root Mean Square Error of Approximation (RMSEA; with values $\leq .08$ indicating adequate to good fit; Browne & Cudeck, 1993), Comparative Fit Index (CFI; values $\geq .90$; Bentler, 1990), and the Tucker Lewis Index (TLI; values $\geq .90$; Bentler, 1990). The χ^2 -test is sensitive to sample size. To reduce this sensitivity, the χ^2 -value is divided by the degrees of freedom (χ^2/df), of which the result should be lower than 3 (Kline, 2005). The analysis was performed in LISREL 8.71 (Jöreskog & Sörbom, 2004). The fit of the 4-factor model was adequate: $\chi^2 (246, N=521) = 494.91, p < .01$, with $\chi^2/\text{df} = 2.01 < 3$, RMSEA = .04, CFI = .98, TLI = .96).

Teacher-child interactions were assessed using a self-report questionnaire, the Teacher as Social Context (TASC; Wellborn et al., 1992; Dutch translation by Van de Water & Colpin, 2005), which concerns the teacher's behavior towards each student in his or her classroom. The teacher rated 41 statements about his/her behavior toward each child

separately on a 4-point-scale, with 0 being 'not at all true' and 3 being 'very true'. The questionnaire contains three subscales: Involvement (14 items, e.g., "I spend time with this student"), Structure (15 items, e.g., "I find it hard to be consistent with this student" reversed coded item), and Autonomy support (12 items, e.g., "I try to give this student a lot of choices about classroom assignments"). Each of these subscales contains different dimensions, but in this study we only used the subscales as such (and not the different dimensions). A total score for each subscale was calculated by averaging the positive and the reverse coded negative items. This results in a score ranging from 0 to 3, with 3 indicating relatively more involvement, structure, and autonomy support, respectively. Cronbach's alphas at the beginning of the school year were .84, .85, and .91 for the subscales involvement, structure and autonomy support, respectively. We conducted confirmatory factor analysis to test the hypothesized underlying factor structure in LISREL 8.71 (Jöreskog & Sörbom, 2004). The three-factor model, in which the items belonging to involvement, structure, and autonomy support loaded on three different factors, had an adequate fit to the data according to CFI = .98, TLI = .98, and SRMR = .04 (Standardized Root Mean Square Residual, with values with values <.10 indicating adequate fit, Kline, 2005).

Sex was dummy coded (0 = girls; 1 = boys).

Statistical analyses

To evaluate the statistical effect of teacher reported involvement, structure, and autonomy support on children's domain-specific and global self-evaluations, we conducted multiple hierarchical regression analysis with self-concept as the outcome. A separate set of analyses was conducted for each of the three domain-specific (academic, social, and behavioral) and global self-evaluations. The analyses were conducted in three steps. In the first step self-concept in fall was entered into the model to control for the initial level of self-concept at the beginning of the second grade. Sex of the child was included in the first step as

well, as research has shown it is possible to find gender differences in self-evaluations (cf. supra). In a second step, all three characteristics of the teacher-child interactions were added to the model: involvement, structure, and autonomy support. In the last step, we tested for differences in the magnitude of the associations between boys and girls, by fitting a multi-group model to the data which allowed all paths to be estimated for boys and girls separately. In all models, standard errors were adjusted to account for the clustering of data within classrooms, using robust standard errors (Williams, 2000). All structural models were run in Mplus version 4.1 (Muthén & Muthén, 1998-2009).

As stated, approximately half of the children were randomly assigned to the GBG. Although exploring intervention effectiveness was not an objective of this study, we first tested whether the magnitude of the associations were different between controls ($n = 283$) and intervention group children ($n = 287$), using a multi-group model. Controls served as the reference category. The steps 1 and 2 were fitted for academic, social, behavioral, and global self-concept separately. We then tested whether the associations between children's self-concept and the three dimensions of teacher-child interactions in the intervention group were different from those among the control group children. Over these models tested significant differences were found in the global self-concept model ($Wald(3) = 8.90, p = .03$). It appeared that only one path differed between groups: only in the GBG classrooms did teacher autonomy support predict children's global self-concept ($Wald(1) = 7.92, p < .01$). There were no differences between controls and intervention children for the academic ($Wald(3) = 6.76, p = .08$), social ($Wald(3) = 4.22, p = .24$), and behavioral domain ($Wald(3) = 2.12, p = .55$). We conclude that very little support was found for the presence of differences between the intervention and the control group in the links between the dimensions of teacher-child interactions and children's global and domain specific self-concept. Therefore the entire sample was used in all further analyses.

Results

Descriptive statistics

Means and standard deviations for boys and girls for all variables are presented in Table 1. Overall mean scores for teacher reported behaviors were high and standard deviations were small. Results showed that teachers reported high levels of structure, with relatively less (but still high) involvement and autonomy support (involvement vs. structure: $t(554) = -12.69, p < .001$; structure vs. autonomy support: $t(554) = 16.93, p < .001$; involvement vs. autonomy support: $t(566) = 5.45, p < .001$). In fall teachers reported to be more involved ($t(553) = 2.92, p < .01$), structuring ($t(553) = 2.45, p = .02$), and autonomy supportive ($t(553) = 2.71, p < .01$) toward girls than boys. Like for teacher behaviors, mean scores for domain-specific and global self-evaluations were high and standard deviations were small. A series of repeated measures ANOVA with measurement wave as the within subjects variable and sex as the between subject variable was run to test for differences in self-concept between boys and girls. Over the two measurement waves, compared to girls, boys had a higher academic self-concept ($F(1, 551) = 4.03, p = .05$), while girls rated their behavioral self-concept more positive than boys ($F(1, 551) = 10.86, p < .01$). No sex differences were found for social ($F(1, 551) = 2.06, p = .15$) and global self-concept ($F(1, 551) = .28, p = .60$).

The bivariate Pearson correlations between teacher involvement, structure, and autonomy support and academic, social, behavioral, and global self-concept are reported in Table 2. Significant cross-time stability was found for global and the three domain-specific self-concepts (r ranging from .42 to .49). Significant longitudinal correlations (small to medium, see Cohen, 1988) were observed between global and the three domain-specific self-concepts and involvement and autonomy support. For teacher structure, we only found significant associations with behavioral and academic self-concept (small to medium correlations, see Cohen, 1988).

Effect of teacher reported involvement, structure, and autonomy support on children's academic, social, behavioral, and global self-concept

Results of the hierarchical regression analyses regarding the prediction of self-concept are summarized in Table 3. A separate set of analysis was conducted for all 4 aspects of self-concept. The first step showed that 20%, 21%, 26%, and 18% of the total variance in academic, social, behavioral, and global self-concept respectively was explained by the independent variables in the first step. All three domain-specific self-concepts and global self-concept in spring of the second grade were significantly predicted by their initial value in fall. The higher the children's self-concept at the beginning of the second grade, the higher their self-concept at the end of second grade. Sex only contributed to the prediction of behavioral self-concept, with boys reporting lower behavioral self-evaluations than girls. In the second step, teacher reported involvement, structure, and autonomy support were added to the four separate models. The results showed that the characteristics of teacher-child interactions had a small, but significant contribution to children's academic and social self-concept, after controlling for their initial value (and sex). More specifically, academic self-concept in spring was significantly predicted by teacher autonomy support in fall over and above children's initial level of academic self-concept. For social self-concept, the contribution of all three characteristics of teacher-child interactions was significant. As expected the more the teacher reported to be involved with and autonomy supportive of a child in fall of second grade, the higher that child's social self-concept in spring of second grade. Unexpectedly, teacher reported structure in fall negatively contributed to children's social self-concept, when controlling for the other characteristics of teacher-child interactions. Note that the correlation between teacher structure in fall and social self-concept in spring was not significant (see Table 2). Results regarding global self-concept showed that involvement had a positive

contribution. However, the increase in explained variance (from step 1 to step 2) was not significant, which was also the case for children's behavioral self-concept.

Sex differences

To test whether the magnitude of the associations between teacher involvement, structure, and autonomy support and children's self-concept was similar for boys and girls we specified a multigroup model (girls vs. boys) for all four aspects of self-concept separately. The Wald test revealed no differences in these effects for academic ($Wald(3) = 4.82, p = .18$), social ($Wald(3) = 5.24, p = .15$), behavioral ($Wald(3) = 2.60, p = .46$), and global self-concept ($Wald(3) = .89, p = .83$).

Discussion

The aim of the study was to examine whether teacher-child interactions characterized by involvement, structure, and autonomy support in fall predicted children's academic, social, behavioral, and global self-concept in spring of the second grade, after controlling for their initial level in fall. In addition, sex differences in these associations were examined.

Preliminary analyses showed relatively high mean scores for all three dimensions of the teacher-child interactions, involvement, structure and autonomy support. Means for structure were significantly higher than for the other two dimensions. Skinner and Belmont (1993) were confronted with similar results when using self-reported involvement, structure, and autonomy support. They attributed this finding to the fact that teachers are trained to provide structure, whereas involvement is discretionary, and autonomy support is relatively less known to teachers. Similarly, Daniels and Parry (2003) recorded that children reported to have few opportunities to make choices about their learning activities. At the same time young children reported to be less concerned with making such choices, in contrast to their desires for teacher care and help. Thus, the relative levels of involvement, structure, and autonomy support reported by the teacher probably reflect the normative need of children in

this age group. Furthermore, teachers reported to be more supportive of girls than boys (i.e., more involvement, structure, and autonomy support), which is consistent with previous studies (e.g., Baker, 2006; Birch & Ladd, 1997; Ladd et al., 1999).

With regard to self-concept, the high means on global, academic, social, and behavioral self-concept both in fall and spring are consistent with earlier research findings among children of this age (e.g., Jacobs et al., 2002; March, Barnes, Cairns, & Tidman, 1984). Furthermore, girls evaluated their behavior more positive than boys, and boys reported to feel better about their academic abilities than girls. Comparable differences were found in previous studies (see French & Mantzicopoulos, 1999 for a review). No sex differences were found with regard to children's global and social self-evaluations. The latter is supported by prior research findings (e.g., Marsh et al., 1991), while previous studies found boys to rate their global self-concept slightly higher than girls. However, the largest mean effect size favoring boys was found in the 15- to 18-year old group (Harter, 2006; Kling et al., 1999).

In investigating the effect of interactions with the teacher on children's self-concept, we found that the teacher reported characteristics of teacher-child interactions in fall made small contributions to children's self-evaluations in spring, after controlling for their initial value (and sex). The effects were dependent on the type of self-concept. More specifically, the results showed that children's perceived competence in the social domain was positively predicted by teacher involvement and autonomy support and negatively by teacher structure. Children's perceptions of their academic abilities were predicted by the teacher's autonomy supportive behaviors. Children's perceived behavioral competence and global self-concept were not significantly forecasted by the teacher behavior dimensions. The findings were similar for boys and girls.

These findings have several implications. First, our study extends findings of previous research investigating supportive teacher-child interactions and children's self-concept. While

the majority of previous studies revealed supportive teacher-child interactions and children's self-concept to be associated, we provided stronger evidence on the direction of effects, showing that supportive teacher-child interactions rated by the teacher at the beginning of second grade predicted (aspects of) children's self-concept at the end of the school year.

Second, these findings indicate that different aspects of children's self-concept are predicted by different characteristics of teacher-child relationships. This underscores the importance of investigating multiple dimensions of self-concept and teacher-child interactions. With regard to children's social self-concept, the results showed that children's social self-concept was predicted by all three characteristics of teacher-child interactions. Children's social self-concept was positively predicted by teacher involvement and autonomy support. Teacher provided structure, however, negatively contributed to social self-concept, after controlling for the initial value of self-concept and teacher involvement and autonomy support. As the correlation analysis showed that there was no significant associations between teacher structure in fall and social self-concept in spring, this unexpected negative link was probably the result of suppression (see *classical suppression* in Kline, 2005). However, this does not imply this finding is irrelevant (Kline, 2005). It may indicate that a teacher may provide structure in several ways. The first way is closely linked to autonomy support and involvement, contributing to self-concept in the expected way. The second way is distinct from autonomy support and involvement, and may refer to structure provided in an uninvolved, autonomy unsupportive manner. Reeve, Deci, and Ryan (2004), for example, suggested that structuring practices should be offered in an autonomy supportive way to have positive effects; this was supported in research with groups of young children and adolescents (e.g. Koestner, Ryan, Bernieri, & Holt, 1984). Valeski and Stipek (2001) also showed that structure was not always positive: they found that structure had a negative effect on children's attitude toward school. In this case the teacher provided structure in a rigid way, in an

environment lacking autonomy. By taking the three dimensions, involvement, structure, and autonomy support into account, we found that structure, filtered out for involvement and autonomy support had a negative effect on social self-concept. This finding further underscores the importance of exploring all three characteristics involvement, structure, and autonomy support for self-concept and other child outcomes.

Thus these findings showed that children's social self-concept was nourished by warm, accepting, respecting, and stimulating teachers, who did not negatively structure the child's environment (e.g., rigidly apply rules). As social self-concept refers to the child's perceived abilities in social situations, including interactions with the teacher, it is not surprising that high social self-concept is forecasted by supportive teacher-child interactions. Similarly, others found in research with older children that only the social self-concept was predicted by interaction characteristics with other significant others, such as peer acceptance (Donders & Verschueren, 2004; Jackson and Bracken, 1998).

The results concerning children's academic self-concept indicated that the more teachers reported to be respectful towards a child's opinions and ideas, stimulate him/her to explore his/her interests, and explained the relevance of learning activities at the beginning of the school year, the higher that child's academic self-concept one year later. Previous research showed that children's academic self-concept was associated to all three dimensions, teacher structure (Valeski & Stipek, 2001), autonomy support (i.e., positive teacher feedback; Parsons et al., 1982), and a positive and accepting teacher-child relationship (Muijs, 1997; Pekrun, 1990). However, these studies did not simultaneously examine all three characteristics of teacher-child interactions. Our findings go beyond these found in previous studies, in that autonomy support of the teacher at the beginning of the school year also predicted high academic self-evaluations at the end of the school year above and beyond teacher involvement and structure.

Furthermore, children's behavioral and global self-concepts were not significantly affected by teacher-child interactions, in contrast to our expectations. We examined teacher involvement, structure, and autonomy support as more positively oriented characteristics of teacher-child interactions. With regard to behavioral self-concept other aspects of teacher-child interactions might be more important. Research has shown that for children's externalizing behavior, teacher-child conflict was more important than teacher-child closeness (see Doumen, Verschueren, Buyse, Germeijs, Luyckx, & Soenens, 2008; Ladd et al., 1999). Perhaps negative characteristics of teacher-child interactions are more salient for behavioral aspects of children's lives, and by extension for behavioral self-perceptions. With regard to children's global self-concept our findings contrast those in cross-sectional studies (e.g., Colwell & Lindsey, 2003; Demaray et al., 2009; Harter, 1996). Moreover, research has shown that interactions with peers (e.g., Rudolph et al., 1995) and especially with parents (e.g., Doyle & Markiewicz, 2005; Peterson et al., 1983; Verschueren & Marcoen, 1999) can affect children's global self-concept. Unlike parents and peers with whom the child interacts over a longer period of time and in numerous situations, the durations and diversity of the interactions with the teachers are generally more limited, which may explain why teacher involvement, structure, and autonomy support did not predict children's feelings of being a worthy person in general.

The third implication concerns the finding that the associations between the characteristics of teacher-child interactions and global and domain-specific self-concept were similar for boys and girls, despite the level differences in teacher involvement, structure, and autonomy support and children's behavioral and academic self-concept. Prior research did show sex differences in these links (e.g., Colwell & Lindsey, 2009; Parsons et al., 1982). However, these findings were cross-sectional. Our results indicate that teacher-child interactions predict the self-concept of girls and boys in the same way. More research will be

needed to better understand sex differences in the longitudinal links between teacher-child interactions and children's self-concept.

Taken together these findings provide some support for the hypothesis put forth by symbolic interactionists (e.g., Cooley, 1902; Mead, 1934) and attachment theorists (e.g., Bowlby, 1969; Bretherton, 1993; Cassidy, 1990) in that supportive interactions with significant others can result in positive feelings toward the self (see Harter, 1999). Moreover, our study nuanced the theory in that the impact of supportive interactions with *teachers* characterized by involvement, structure, and autonomy support is especially limited to specific domains of children's self-concept, namely the social and academic domain (at least for second grade children) (see also Donders & Verschueren, 2004). These findings are strengthened by using different sources of information for predictor and outcome variables. We asked the teacher about his/her interactions with each child and the children about their self-concept. This makes finding relationships more difficult (cf. Gecas & Schwalbe, 1986; Skinner & Belmont, 1993), but eliminated the possibility of finding effects due to confounding. In addition, this shows that teacher perceptions of his/her interactions with a child relates to child rated outcomes, highlighting the importance of the perceptions of the teacher concerning involvement, structure, and autonomy support.

Limitations

Some limitations should be considered when interpreting these results as well. A first limitation concerns the teacher rated teacher-child interaction characteristics and child rated global and domain-specific self-concepts. These ratings resulted into high means and small variance scores, prompting the question of reporter bias, more specifically social desirability. This is a frequently presented problem when using self-reports. Social desirability results into a generally more flattering report about the self and a restricted range of the answers (Goffin & Gellatly, 2001). The resulting range restriction in self-reported measures can attenuate

relations with other variables (see Bobko, 1995). This means that the relations between the teacher-child interaction characteristics and the different aspects of children's self-concept might actually be stronger than the ones we found in this study.

Second, the reliability as measured by the Cronbach's alpha was low for the four self-concept scales at the beginning of second grade (De Vellis, 2003). By the end of second grade the scale reliability had reached acceptable levels ($>.70$; De Vellis, 2003). This probably reflects one of the difficulties when assessing young children's self-evaluations. Previous studies have also reported low reliability coefficients at a young ages, and an increase over time as a result of the children's self-judgments becoming more accurate (Davis-Kean & Sander, 2001; French & Mantzicopoulos, 2007; Jacobs et al., 2002; Wigfield et al., 1997). Despite the low reliability of the self-concept scales at the beginning of second grade, these scales were significantly associated to the corresponding scale at the end of second grade, with correlation in the medium range (Cohen, 1988).

Third, it must be noted that the associations demonstrated in the study do not imply causal links. Although we used a longitudinal design and controlled for the initial level of self-concept, we cannot rule out that other processes, not included in the present study, underlie the observed links between teacher-child interactions and children's self-concept, such as the perception of the child of the teacher-child interaction (see Connell & Wellborn, 1991).

Furthermore, teacher involvement, structure, and autonomy support only accounted for a small proportion of the variation in self-concept between children. However, the effects are not negligible. We examined the effect of one teacher in the lives of children, while children are confronted with many different teachers during schooling, all of which may have a small contribution to children's self-perceptions. Perhaps all these experiences with different teachers together may contribute the child's self-concept to a larger extent.

Also, the study included an average second grade elementary school population. Research has shown that children with behavioral problems, for example, frequently encounter more negative interaction with teachers (see Stormont, 2002; Sutherland, Lewis-Palmer, Stichter, & Morgan, 2008; Sutherland & Oswald, 2005) than children without these problems. In addition, there is some evidence that positive teacher-child interactions can act as a protective factor against negative developmental outcomes for children at risk due to a difficult temperament among other maladjusted behavior, and adverse care giving experiences such as low mother-child attachment quality (see e.g., Buyse, Verschueren, Doumen, Van Damme, & Maes, 2008; Hughes, Cavell, & Jackson, 1999). This suggests that including high-risk groups (e.g., children with externalizing behavior or with an insecure parent attachment) may result into a greater role of teachers in children's self-concept.

Finally, the sample was ethnically homogenous. Most of the children had a Flemish Belgian background. Studies with more ethnically diverse samples are needed before these findings can be generalized.

Implications for research and practice

Our findings have implications for future research and preventive practice. They suggest that it is advantageous to assess multiple characteristics of teacher-child interactions and multiple aspects of children's self-concept. We showed that involvement, structure, and autonomy support have different effects and that global, academic, social, and behavioral self-concept have different antecedents. Also it would be interesting to investigate whether training teachers to be more involved, structuring, and autonomy supportive toward the children in the classroom would result in higher levels of self-concept, at least in the social and academic domain. This would not only establish some evidence for a causal relationship between teacher involvement, structure, and autonomy support and children's (social and academic) self-concept, but also provide further insight in the characteristics of teacher-child

interactions to be targeted in interventions aimed at enhancing children's self-concept (see Flay et al., 2005). Furthermore, given that these teacher-child interaction characteristics are predictive of children's self-concept, it would be interesting to investigate determinants of involvement, structure, and autonomy support provided by the teacher, such as school support, teaching experience, and teachers' own self-concept. Research too date is scarce. A very recent study examined antecedents (i.e., individual and environmental pressures) of (high school) teachers' use of psychological control (a form of low autonomy support) (Sierens, Soenens, Vansteenkiste, Goossens, & Dochy, submitted). It was found that that pressure from above (e.g., pressuring school administration and parents) and pressure from within (i.e., teachers' low relative autonomy for teaching) were related to psychological control and that these associations were mediated by burnout.

In general, these findings add to the growing body of literature emphasizing the role of supportive teacher-child interactions for children's development. This has important implications for the professional development of teachers, in that establishing supportive interactions with their pupils seems an essential goal for teachers, in addition to their formal teaching activities. During their education, it would be desirable that teachers acquire knowledge of theory and research on the role of their interactions with children for children's developmental outcomes on multiple domains, such as children's self-concept. Moreover, learning how to establish supportive interactions with each child should be dealt with during the education of future teachers and during their pre- and in-service training. Traditionally, teachers are aware of their role in managing the behavior of their pupils (Rydell & Henricsson, 2004), leading to a large interest in and positive attitudes toward structuring practices (Gunther & Coutinho, 1997), such as using praise for appropriate behavior (e.g., Ferguson & Houghton, 1992). However, learning how to support a child's autonomy and establish a warm and caring relationship with hem/her should also be handled. Some involved

and autonomy supportive practices have been identified, such as smiling and talking to students, and providing choices and using non-coercing language (Daniels & Perry, 2003; Deci, Eghari, Patrick, & Leone, 1994; Katz & Assor, 2007). Incorporating these tools to establish involved, structuring, and autonomy supportive interactions may allow teachers to increase their positive role for children's adaptive development, including children's self-concept.

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